Volvo Penta IPS Autopilot System

DPU Installation and System Connections

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Handbook information

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Installation Procedures

1.1 Introduction

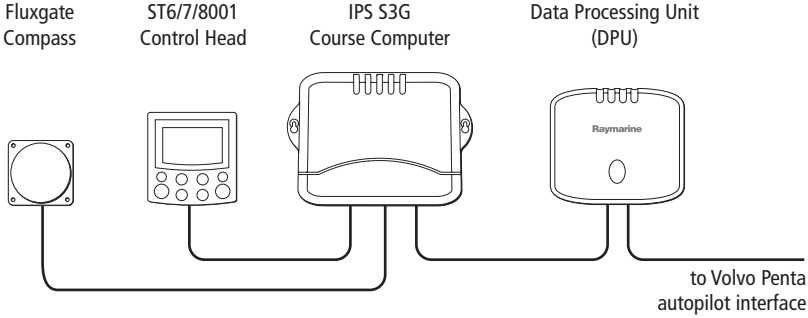
The Volvo Penta IPS Autopilot System consists of an IPS S3G Course Computer corepack and an IPS DPU.

The IPS S3G corepack contains a Course Computer and a fluxgate compass. There is no need to fit a drive unit or rudder feedback unit. This system can only be used with a Volvo Penta IPS system.

The IPS Autopilot system is compatible with ST6001, ST7001 and ST8001range of autopilot control units. Raymarine wireless controllers, the S100 or SmartController can be fitted as optional extras.

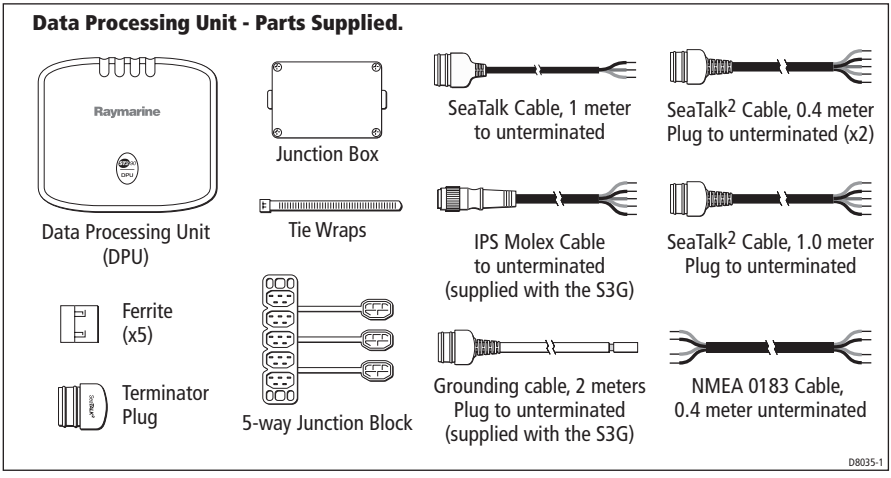
This handbook will guide you through the installation of your IPS DPU and the connections that you will need to make to the other parts of the IPS system.

Volvo Penta IPS System - Top Level Schematic



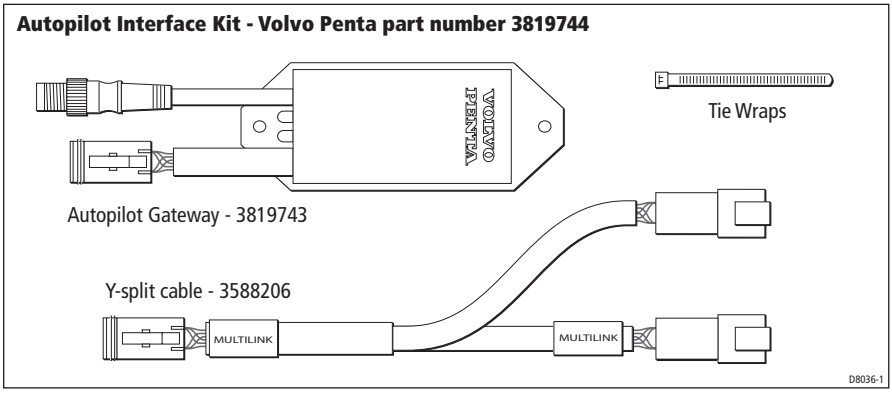
Please refer the the back of this handbook for a detailed schematic diagram

1.2 Parts Supplied



Additional parts required

To complete the installation you will also require the Autopilot Interface kit from Volvo Penta. Part Number 3819744, comprising of a Gateway, Y-split, Assembly instruction and tie-wraps.



1.3 Planning the installation

Important Safety Information

WARNING: Product installation
This equipment must be installed and operated in accordance with the Raymarine instructions provided. Failure to do so could result in poor product performance, personal injury and/or damage to your boat.

Because correct performance of the boat's steering is critical for safety, we STRONGLY RECOMMEND that an Authorized Raymarine Service Representative fits this product.]

WARNING:
The DPU and S3G Course computer are not suitable for use in the vivinity of engines, fuel tanks or in any other areas where fuel vapour is likely to be present.

WARNING:
Make sure you have switched off the power supply before you start installing this product.

WARNING: Navigation aid
Although we have designed this product to be accurate and reliable, many factors can affect its performance. As a result, it should only be used as an aid to navigation and should never replace commonsense and navigational judgement. Always maintain a permanent watch so you can respond to situations as they develop.

EMC Installation Guidelines

Please refer to the *SmartPilot Commissioning Guide* for applicable EMC guidelines

Product disposal

When you want to dispose of this product (for example, at the end of its working life), please do so in accordance with local regulations.

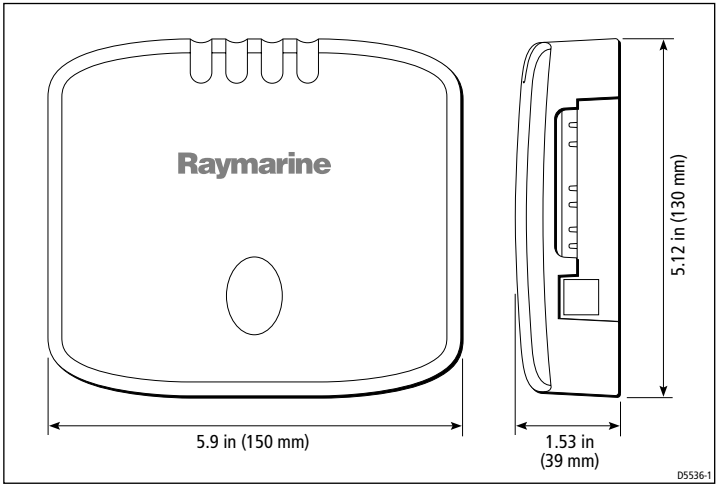
1.4 S3G Course Computer

Please refer to the SmartPilot Commissioning Guide for detailed installation instructions for the IPS S3G and fluxgate compass.

1.5 Control Head

Please refer to the Control Head installation sheet for detailed installation instructions.

1.6 Data Processing Unit (DPU)



CAUTION: The DPU is not waterproof and so must be installed in a dry location.

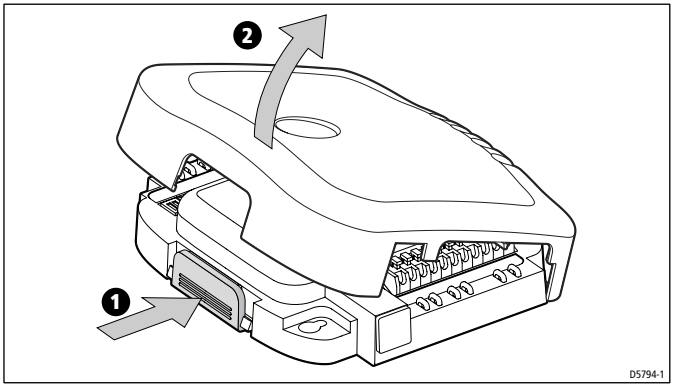
The DPU must be positioned below decks in a dry location where:

- It is protected against physical damage.
- It is at least 9 in (230 mm) from a compass.
- It is at least 20 in (500 mm) from radio receiving equipment.
- There is reasonable access for installation and servicing.

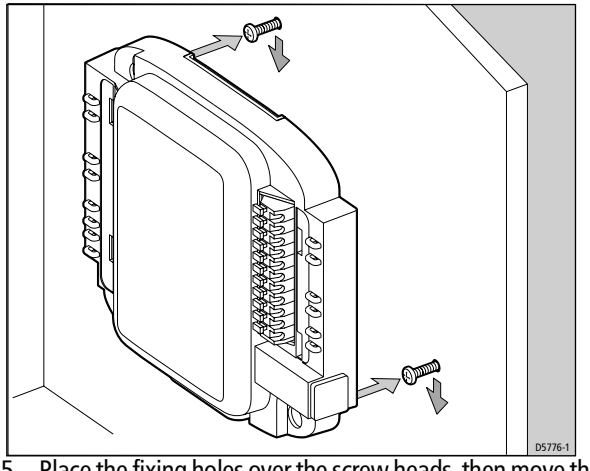
Fitting the Data Processing Unit

Fit the Data Processing Unit to a vertical surface, as follows:

1. Remove the outer cover.



2. Place the DPU in the required position and mark the position of the fixing holes.
3. Using a 1/8 in (3.5 mm) drill, drill a pilot hole for each of the two fixing screws.
4. Screw one of the self-tapping screws provided (No 8 x 1 in) into each hole, so each screw-head is at least 15 mm from the surface.



5. Place the fixing holes over the screw heads, then move the DPU down so the screw heads are at the top of the keyhole slots.
6. Tighten the self-tapping screws to secure the DPU in position.

1.7 Running SeaTalk & NMEA2000 cables

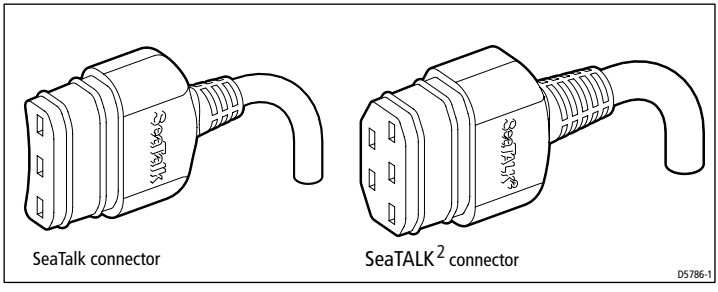
Cable routing practices

When running cable, always observe the following guidelines:

- If a cable has to be fed through the deck, always use a good quality deck gland.
- Where cables are fed through holes, always use grommets to prevent chafing.
- Secure long cable runs so they do not present a hazard.
- Wherever possible, route cables away from fluorescent lights, engines and radio transmitting equipment, as these may cause interference.

Identifying cables

SeaTalk, SeaTALK^2 and NMEA 2000 buses are used in this system. SeaTalk uses a 3-core cable and SeaTALK^2 and NMEA 2000 uses a 5-core, screened cable. Each cable type is available in both made-up form with pre-fitted connectors, and in unterminated form on a drum.



Bus connectors

If you are working with unterminated cable, use the details in the table below to ascertain the correct connections. Cable boots are available to cover the spade terminals used to connect unterminated SeaTALK^2 cables.

SeaTalk and NMEA2000 connections

SeaTalk		SeaTalk² and NMEA 2000	
Wire	**Function**	**Wire**	**Function**
Red	12 V +	Shield	Screen
Uninsulated	12 V -	Red	12 V +
Yellow	Data	Black	12 V -
		White	Signal line high
		Blue	Signal line low

1.8 System power

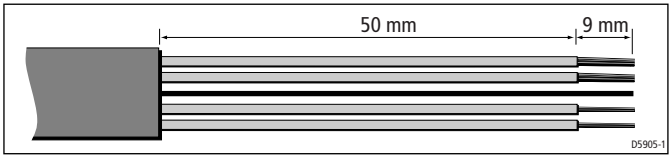
CAUTION:
Incorrectly connected power supplies could cause damage to the system

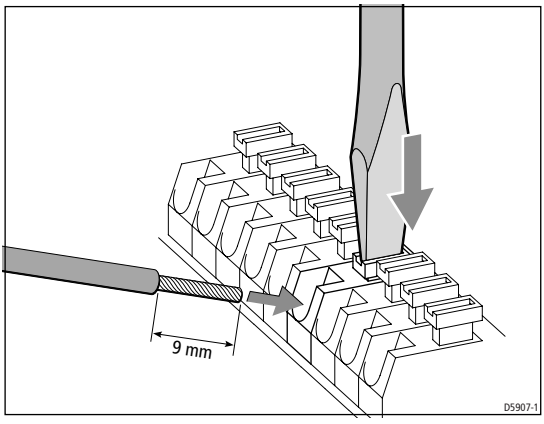
Power will be supplied using the SeaTalk connection from the S3G course computer. DO NOT CONNECT ANY OTHER POWER SOURCE TO THE DPU.

1.9 Cable preparation

In an IPS system, cables not already fitted with moulded connectors must be correctly prepared for connection.

The DPU uses color-coded, spring retention connectors. To make a secure connection to a spring retention connector, prepare the cable for connection, then use the method illustrated below to connect each wire.



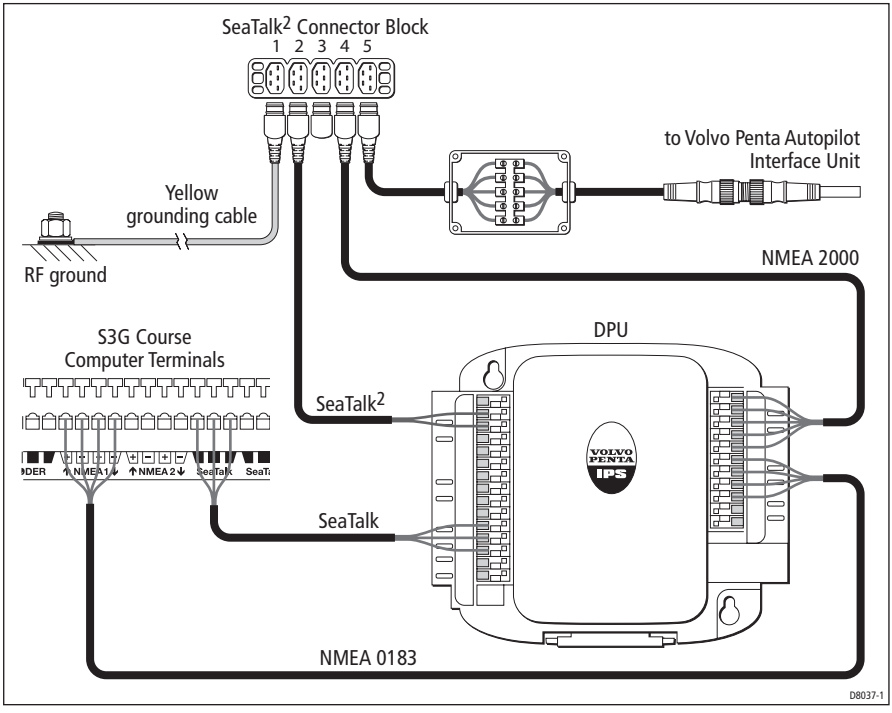


1.10 Connections to DPU

The diagram below illustrates the connections that are required to and from the DPU.

Ferrites

Ensure that all cable connected to the DPU have a clip-on ferrite fitted.



SeaTalk

Using the appropriate cable, connect the SeaTalk terminal on the DPU to one of the SeaTalk terminals on the S3G Autopilot. You will need to cut off the moulded plug and strip the cable as described above.

Note: *Note that the terminals are color coded to match the cable.*

SeaTalk^2

Connect the red and black wires of the SHORT SeaTalk^2 cables to the red and black terminals on the DPU. Ensure the remaining wires are suitably cut back and insulated. Plug the other end into the SECOND terminal of a 5-way SeaTalk^2 connector block.

NMEA 0183

Connect the NMEA 0183 terminal on the DPU to the NMEA 1 terminal on the S3G course computer. Ensure that the following connectivity is achieved:

Wire Color	DPU Connection	S3G Connection
Red	NMEA 0183 In +	NMEA 1 Out +
Blue	NMEA 0183 In -	NMEA 1 Out -
Yellow	NMEA 0183 Out +	NMEA 1In +
Green	NMEA 0183 Out -	NMEA 1 In -

NMEA 2000

Using one of the SHORT SeaTalk^2 cables, connect the NMEA 2000 terminal on the DPU to the FOURTH terminal of the 5-way SeaTalk^2 connector block.

Securing cables and replacing cover

When all of the DPU cables have all been connected, secure each cable to the loops on the DPU, using the cable ties provided.

When all cables are secure, replace the DPU cover.

Do not use the DPU with the cover removed, as this could degrade the EMC performance.

1.11 Additional connections

Three more connections now need to be made to the 5-way connector block.

SeaTalk^2 terminator

Plug the SeaTalk^2 terminator into the CENTER terminal on the 5-way SeaTalk^2 connector block.

Grounding the system

In order to meet the system EMC specification, the SeaTALK^2 cable screen must be connected to the vessel's RF ground point.

Using the grounding cable

Raymarine provide a made-up, RF grounding cable that you are recommended to use, to ground the system.

The grounding cable is yellow and has a SeaTalk^2 connector at one end. Connect this to the FIRST terminal of the 5-way SeaTalk^2 connector block. The unterminated end of the cable is stripped, for connection to the vessel's RF ground point.

If you require additional advice on grounding the IPS DPU, please contact the Raymarine Technical Support Department.

1.12 Connecting to the Volvo Penta system

Volvo Penta Gateway

CAUTION:
Consult your Volvo Penta dealer before making any changes to your existing system.

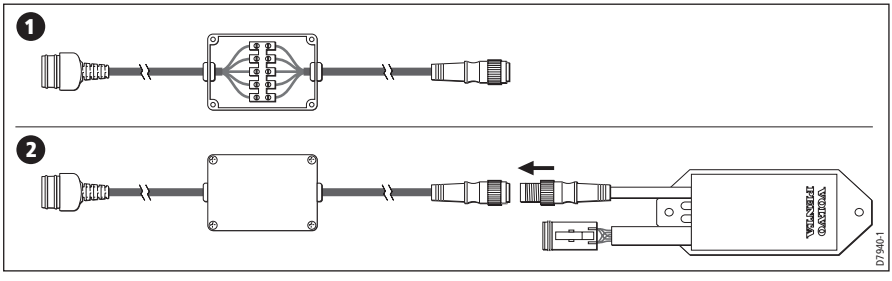
Note: *To connect to the Volvo Penta system you will need to obtain an Autopilot Interface kit from Volvo Penta. Part Number 3819744, comprising of a Gateway, Y-split, Assembly instruction and two tie-wraps.*

Plug the LONG SeaTalk^2 cable into the FIFTH terminal of the 5-way SeaTalk^2 connector block.

Thread the cable into the junction box and connect to the chocblock.

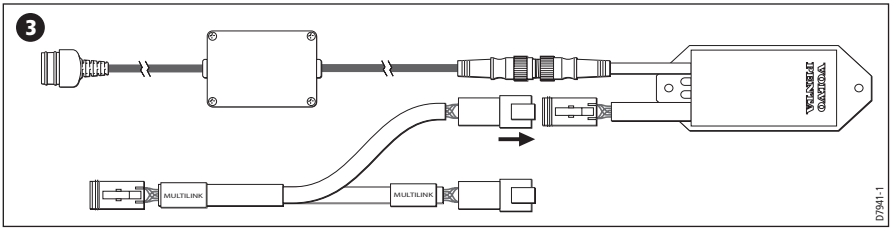
Then, thread the bare end of the Volvo Penta interface cable into the junction box and connect to the chocblock. Ensure that the cable colors match.

Connect the other end of the Volvo Penta Interface Cable (circular connector) to the connector on the Volvo Penta Gateway.

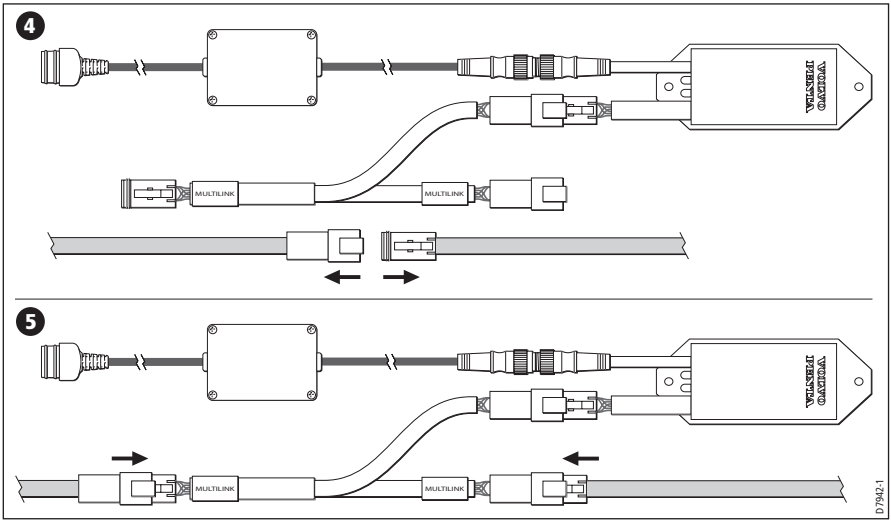


Y-split cable

Connect the Y-split cable to the Volvo Penta Gateway. Use the connection that DOES NOT have a yellow "MUTILINK" label.



Finally, connect to the Volvo Penta system bus using the "MULTILINK" ends of the Y-split cable.



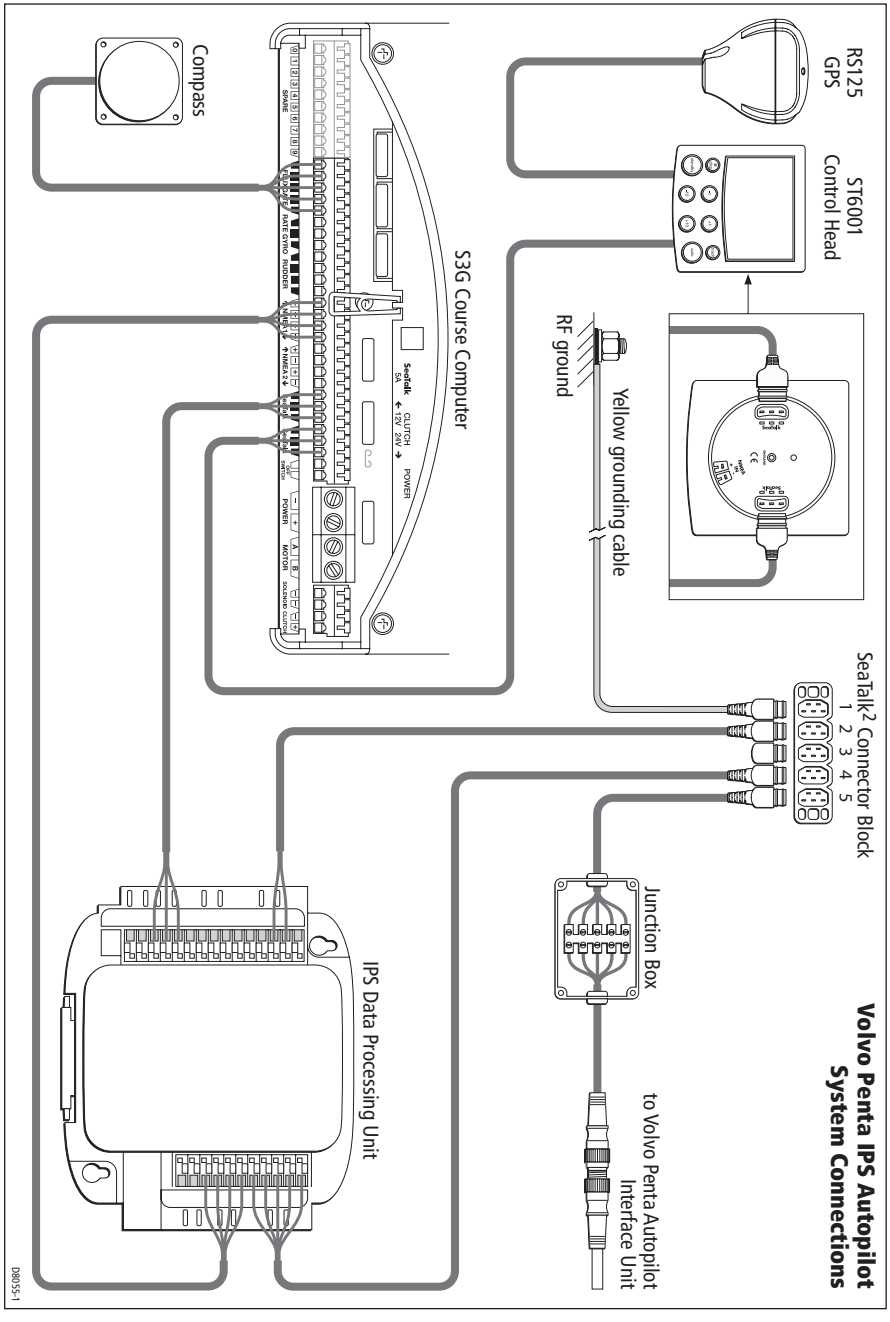
1.13 EMC Conformance

Always check the installation before going to sea to make sure that it is not affected by radio transmissions, engine starting etc.

1.14 Post-installation Checks

Before you proceed to the commissiong stage, it is important to verify your installation. Please follow these simple procedures before commissioning:

1. Power up the IPS autopilot system and start the Volvo Penta IPS engines
   Move the helm by hand and observe the ships rudder guage and the rudder bar on the control unit. These displays should be synchronised.
   In they are not:
   i. Check that the Volvo Penta autopilot interface is connected correctly. You will need to consult your Volvo Penta service agent.
   ii. Check the choc-block connections in the junction box match color for color
   iii. Check the NMEA OUT connections at the DPU and that they are seated properly in the connector.
   iv. Check the NMEA IN connections at the S3G and that they are seated properly in the connector.
2. Drive the boat at a slow speed (approxmately 5 knots) and press **AUTO** on the control unit. Your boat should continue on its current heading.
   If the control unit reads "NO IPS" then repeat the wiring checks in step 1.
3. Use either the +10 or -10 keys or the rotary control to make a course change. Your boat should alter course as directed.
   If the autopilot does not respond, then repeat the wiring checks in step 1.
4. The autopilot is now ready for the commissioning process. Please refer to the commissiong section of the SmartPilot Commissioning Guide.


Volvo Penta IPS Autopilot
System Connections
RS125
GPS
ST6001
Control Head
Yellow grounding cable
RF ground
SeaTalk2 Connector Block
1 2 3 4 5
Junction Box
to Volvo Penta Autopilot
Interface Unit
S3G Course Computer
Compass
IPS Data Processing Unit
D8055-1